GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE:

November 11, 2011

TO:

Chris Lanane, Scott Weaver

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lone Pine, November 11, 2011," for your review. Please refer any comments you may have on the document to me by January 11, 2012. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

SITE: LONE PINE

Report Date: November 11, 2011 Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lone Pine was audited on November 9, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10 FDMS

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) FDMS ${\bf AUD}\Pi$

Date of report:	11/11/11					
Date:	11/9/11			Site name: 1	Lone Pine - FDMS	3
Start:	15:00hrs. PS	ST		Operator: 9	Scott Weaver	
Finish:	15:20hrs. PS	T		Project: 9	SB 270	
Audited By:	Mike Horn			Site Elevation:	3703	ft.
Witness:	Scott Weaver			Amb. Pres.:	900.20	hPa
				Amb. Temp.:	15.3	deg. C
Prop. or Serial No.:	24928			Make:	R & P	
Туре:	PM-10 FI	OMS		Model:	1400ab	
				Last cal. date:	9/27/11	
	AUD:	IT DEVICE(S)				
Make: I	3GI Incorporated			Make: 1	BGI Incorporated	
Model: I	DELTA CAL			Model:	DELTA CAL	
S/N:	525			S/N:	123	
Range:	2 - 20 lp	m		Range:	2 - 20	lpm
(Calibration Factors				Calibration Factor	rs
Slope:	1.00			Slope:	1.00	
Intercept:	0.00			Intercept:	0.00	
Cal Date:	12/22/10 Da	ate of first use	1/12/11	Cal Date:	12/22/10	
	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:	0.150	0.530	14.6	-0.7	893.47	-6.7
Pump off leak check:	N/A	N/A				
(Qa=[dPxTa/Pa] ^{1/2} +b)	Site		Nomina	l Flow Rates
Audit	Audit Flov	v Rate,	Flow Rate	Diff.	Lower Limit	Upper Limit
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)
Total Flow Rate	16.52	16.52	16.66	0.8	15.0	18.4
Bypass/Aux Flow Rate	13.51	13.51	13.66	1.1		
Main Flow Rate	2.99	2.99	3.00	0.3	2.7	3.3
Total Flow Rate	16.49	16.49	16.66	1.0	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measurement Variable	Evaluation Criteria
Wind Speed	At ws \leq 5 m/s, input \pm 0.25 m/s; At ws $>$ 5 m/s, input \pm 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input \pm 0.5° C Gravimetry Lab \pm 1.0 deg. C input \pm 2.0° C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input \pm 5% RH, \pm 1.5°C as dew point Gravimetry Lab: input \pm 5%
Precipitation	input $\pm 10\%$
Barometric Pressure	Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5	input \pm 10%; Design Flow \pm 10% input \pm 4%; Design Flow \pm 5%
TEOM: Total Flow Main Flow Bypass Flow	input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10%
TEOM: Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE

	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CU10, HS10	8/30/11	N/A	N/A
Psychro-Dyne Psychrometer:	RH 04	N/A	1 0	1 0
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

(F)	T	apered	Element Oscil	lating Microba	lance (TEOM)			
				W AUDIT	DMS	* * * * * * * * * * * * * * * * * * *	12.53	2 12
		77		1	VIXIS	T	1	-1
	100				1		-	
Date:	11/9/11	_		Site Name	· Jana 1	D:		-
Start:		PST		Operator	- Latitude U	Weave		_
Finish:	10/11/0	PST			: SB270	rueave	V	
	19.20			Site Elevation				
		-		Amb. Press.		ft		
					L G V L R	in. Hg		
		+		Amb. Temp.	15.5	deg. C		
Prop. Or Ser. No.:	2492							
	29/2	?		Make				
Type:	PM10				1400a /			
				Last Cal. Date:	9/27/1			
					7 7			7
			Device(s)	1				
Make:		PORAT	ED.	Make:	BGI INCOM	RPORATED		1
Model:	DELTA CAL			Model:	DEL TA CAL	MALLU		-
S/N:	0123 5	25		S/N:	DILL IN LINE		r	-
Range:	2 - 20	lpm	1	Range:	1.1116.1	lpm		+
Calibration factors:		1	Calib	ration factors:	2 - 20	-Pill		+-
Slope:	1.0			Slope:	7 -			-
Int.:			 	Int.:	1.0			-
Cal Date:	0.0			Cal Date:	0.0-			-
our bate.	-4			Cai Date:		g		
0	DyT (D 11/2			L. <u></u>				1
Q _a =m[a	PxT _a /P _a) ^{1/2} +b		Altitude Corre	ection Factor:	-1013			
								1-
Leak Check-Initial	Main:	,15	Aux:	.53				1000
Leak Check-Final	Main:		Aux:					-
								+
			Site		Nominal F	low Rates		-
Audit	Audit Flow	Rate	Flow Rate	Diff.	Lower Limit			+
Point	delta P	(VLPM)		(%)	(LPM)	(LPM)		+-
Total Fow Rate	11 02	-	3.00/13.	66=16.6	15.0	18.4		+
Aux. Flow Rate	13-51	72	The same of the sa	10.00	10.0	10.4		4
Main Flow Rate	12.80	Yes,	13.66					
Total Flow Rate	1/116		3.00		2.7	3.3		+
- Total How Hate	16.49		16.66		15.0	18.4		
								<u></u>
			Stand					
A . 1 T	Sampler		True	Raw		7.		
Amb Temp	14.6		****	15.3				
Amb Press	. 882		893.47	900.2				377
								T
	···							
								+
								
								-
								
Comments:								
100000								
								4
		2						-
	10	20	/					

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE:

July 7, 2011

TO:

Chris Lanane, Scott Weaver

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lone Pine, July 7, 2011," for your review. Please refer any comments you may have on the document to me by September 7, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

SITE: LONE PINE

Report Date: July 7, 2011 Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lone Pine was audited on July 6, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10 FDMS

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) FDMS AUDIT

Date of report:	7/7/11					
Date:	7/6/11			Site name: I	Lone Pine - FDMS	
Start:	14:15hrs. I	PST			Scott Weaver	
Finish:	14:35hrs. I			Project: S		
Audited By:	Mike Horn	.01		Site Elevation:	3703	ft
Witness:	Scott Weaver			Amb. Pres.:	888.40	
WithC35.	Scott Weaver			Amb. Temp.:		deg. C
Prop. or Serial No.:	24928			Make:	R & P	acg. C
Type:	PM-10 F	EDMS		Model:	1400ab	
Type.	1 141-10 1	DIVIS		Last cal. date:	6/7/11	
	ΔΙΠ	OIT DEVICE(S)		Lasi cai. uate.	0/7/11	
Make 1	BGI Incorporated	on Device(o)		Make: I	BGI Incorporated	
	DELTA CAL				DELTA CAL	
S/N:	525			S/N:	123	
Range:	2 - 20 l	nm		Range:	2 - 20	lpm
	Calibration Factors	•			Calibration Factor	1
Slope:	1.00			Slope:	1.00	
Intercept:	0.00			Intercept:	0.00	
Cal Date:		Date of first use 1	1/12/11	Cal Date:	12/22/10	
Cui Dutc.	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:	0.060	0.390	29.0	~0.2	885.36	-3.0
Pump off leak check:	N/A	N/A		5.2		2.0
	$Qa = [dPxTa/Pa]^{1/2} +$		Site		Nominal	Flow Rates
Audit	Audit Flo	w Rate,	Flow Rate	Diff.	Lower Limit	Upper Limit
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)
Total Flow Rate	16.61	16.61	16.65	0.2	15.0	18.4
Bypass/Aux Flow Rate	13.51	13.51	13.65	1.0		
Main Flow Rate	3.04	3.04	3.00	-1.3	2.7	3.3
Total Flow Rate	16.63	16.63	16.65	0.1	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measurement Variable	Evaluation Criteria

Wind Speed At $ws \le 5 \text{ m/s}$, input $\pm 0.25 \text{ m/s}$;

At ws > 5 m/s, input \pm 5% Starting threshold: 0.5 m/s;

R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H

Wind Direction input $\pm 5^{\circ}$

Starting threshold: 0.5 m/s;

R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young

05103 Wind Monitor

Temperature input $\pm 0.5^{\circ}$ C

input \pm 2.0° C for PM-10, PM-2.5 samplers

Relative Humidity Ambient: input $\pm 5\%$ RH, ± 1.5 °C as dew point

Gravimetry Lab: input ± 5%

Precipitation input $\pm 10\%$

Barometric Pressure Ambient: input \pm 10 hPa

TEOM: ± 10 mm mercury

PM-10: Hi-Vol SSI, Partisol, BGI, input \pm 10%; Design Flow \pm 10%

PM-2.5 input \pm 4%; Design Flow \pm 5%

TEOM: Total Flow input $\pm 10\%$; Design Flow $\pm 10\%$

Main Flow input \pm 10%; Design Flow \pm 10% Bypass Flow input \pm 10%; Design Flow \pm 10%

TEOM: Leak Check Main Flow: < 0.15 LPM

Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE

	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

	7	apered	Element Osci	illating Microba	alance (TEOM)		
190000			FLO	OW AUDIT	-DMS	**********	4 F 4 F F F F F F
		T			MAIN	T	T T
100					0		
Date	7///11		1	Site Name	· ton	2	
Start		PST		Operator	Jony,	Weave	
Finish:		PST			scoul	Meane	1
7 1111311.	14.00	PSI			: SB270		
s m				Site Elevation		ft	
				Amb. Press.		in. Hg	
	ļ			Amb. Temp.	: 29.2	deg. C	1
D 0 0 11	AITAN						
Prop. Or Ser. No.:		7			: R&P		
Type:	PM10				: 1400a, /		
				Last Cal. Date	6/7/11		
					1/1/1		
		Audit	Device(s)			1	
Make:	BGT INCOM	DODAT	rin	Make:	BGI INCO	DDODATED	j
Model:	DELTA CAL	a_OIXM.I.	40	Model:	- COL - 11111111	CONALED	
S/N:	0123 52	5	 	S/N:	DILLE GE	1	
Range:	Making J		 		1010		
Calibration factors:	2 - 20	lpm		Range:	2 - 20	ıpm	
		ļ	Calib	oration factors:			
Slope:	1.0		 	Slope:			
Int.:	0,0/_	1		Int.:	0.0-		
Cal Date:	1/4/6			Cal Date:			
	6.7						
Q _a =m[d	PxT _a /P _a J ^{1/2} +b	1	Altitude Corr	rection Factor:	-1013		"
All the country and the country of t				T	. 1012		
Leak Check-Initial	Main:	.06	Aux:	29			
Leak Check-Final	Main:	100	Aux:	THE RESIDENCE AND ADDRESS OF THE PARTY OF TH			
				ļ			
			Site		Nominal F	low Peter	
Audit	Audit Flow	Rate	Flow Rate	Diff.			
Point		(VLPM)	(VLPM)	(%)	Lower Limit		
Total Fow Rate	17 61	(e Li mi)			(LPM)	(LPM)	
Aux. Flow Rate	16.6		3.80/13.	65=16-6	5 15.0	18.4	
	13.51		13-05				
Main Flow Rate	3,042		3.00	e	2.7	3.3	
Total Flow Rate	16.63		16-65		15.0	18.4	
			Stan				
	Sampler 29.8		True	Raw			
Amb Temp	24.0	550		29.2			
Amb Press	. 874		885.30	888.4			
		-					
Comments:							
			1183				
					17	1	
×			,				
×							

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE:

April 11, 2011

TO:

Chris Lanane, Scott Weaver

FROM:

Mike Horn /

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lone Pine, April 11, 2011," for your review. Please refer any comments you may have on the document to me by June 13, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

SITE: LONE PINE

Report Date: April 11, 2011 Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lone Pine was audited on April 4, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10 FDMS

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) FDMS AUDIT

Date of report:	4/11/11					
Date:	4/4/11			Site name:	Lone Pine - FDMS	5
Start:	14:40hrs.	PST		Operator: S	Scott Weaver	
Finish:	15:00hrs.	PST		Project: S	SB 270	
Audited By:	Mike Horn			Site Elevation:	3703	ft.
Witness:	Scott Weaver			Amb. Pres.:	892.20	hPa
				Amb. Temp.:	24.3	deg. C
Prop. or Serial No.:	24928			Make:	R & P	
Туре:	PM-10	FDMS		Model:	1400ab	
				Last cal. date:	3/22/11	
	AU	DIT DEVICE(S)				
Make:	BGI Incorporated			Make: 1	BGI Incorporated	
Model:	DELTA CAL			Model:	DELTA CAL	
S/N:	525			S/N:	123	
Range:	2 - 20	lpm		Range:	2 - 20	lpm
	Calibration Factor	S			Calibration Factor	rs
Slope:	1.00			Slope:	1.00	
Intercept:	0.00			Intercept:	0.00	
Cal Date:	12/22/10	Date of first use 1	/12/11	Cal Date:	12/22/10	
	Main:	Aux:	Sampler temp:	<u>Diff.</u>	Sampler press:	Diff.
Leak check:	0.060	0.350	23.1	-1.2	888.40	-3.8
Pump off leak check:	N/A	N/A				
	$Qa=[dPxTa/Pa]^{1/2}$	+b	Site		Nominal	Flow Rates
Audit	Audit Fl	ow Rate,	Flow Rate	Diff.	Lower Limit	Upper Limit
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)
Total Flow Rate	16.59	16.59	16.66	0.4	15.0	18.4
Bypass/Aux Flow Rate	13.46	13.46	13.66	1.5		
Main Flow Rate	2.97	2.97	3.00	1.0	2.7	3.3
Total Flow Rate	16.54	16.54	16.66	0.7	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measureme	ent Variable	Evaluation Criteria
Wind Speed	I	At ws ≤ 5 m/s, input ± 0.25 m/s; At ws > 5 m/s, input ± 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direc	tion	input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperatu	re	input \pm 0.5° C input \pm 2.0° C for PM-10, PM-2.5 samplers
Relative Hu	umidity	Ambient: input \pm 5% RH, \pm 1.5°C as dew point Gravimetry Lab: input \pm 5%
Precipitation	n	input ± 10%
Barometric	Pressure	Ambient: input \pm 10 hPa TEOM: \pm 10 mm mercury
PM-10: Hi- PM-2.5	Vol SSI, Partisol, BGI,	input \pm 10%; Design Flow \pm 10% input \pm 4%; Design Flow \pm 5%
TEOM:	Total Flow Main Flow Bypass Flow	input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10% input \pm 10%; Design Flow \pm 10%
TEOM:	Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	Р9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		

108

9/8/10

0.41

0.6

Chinook Eng. Streamline FTS

		apered	Element Osci	llating Microba	lance (TEOM)		FR 19746 475
			FLC	OW AUDIT	DMS		
Date	. 11/1/1/1				1	_	/*==-72
Stari		1505		Site Name		ne	
		PST		Operator		Neove	
Finish	: 15:00	PST			: SB270		
	ļ			Site Elevation	THE RESIDENCE AND THE RESIDENC	ft	
	ļ			Amb. Press.	D / A 66	in. Hg	
	ļ			Amb. Temp.	124.3	deg. C	
		-			1		
Prop. Or Ser. No.	2492	5	.1	Make			
Type:	PM10	7			1400a		
		2		Last Cal. Date:	3/22/11		
					Jealet		
***		Audit	Device(s)				
Make:	BGI INCOM	RPORAT	ED	Make:	BGI INCO	DDODATED	
Model:	DELTA CA	- Julia	1	Model:	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	NUMBER	
S/N:	0123 5	25		S/N:		1	
Range:	2 - 20	Ipm	1	Range:	-U.C.	Inm	
Calibration factors:		1	Calib	ration factors:	2 - 20	ibiti	
Slope:	1.0	-	Call	Slope:		 	
Int.:	1.0	:		Int.:	1.0		
Cal Date:	1/1/2	, l	1	Cal Date:	0.0		
Jan Date.		1	ļ	Cai Date:		j	
O	IPxT _e /P _e J ^{1/2} +b	-	A 1414				
$\omega_a = m[c]$	1 × 1 × 1 × 1	4	Altitude Corr	ection Factor:	-1013		
Look Cheel 1 201			<u> </u>				
Leak Check-Initial	Main:	.01	Aux:				
Leak Check-Final	Main:		Aux:	Contract of			
			Site		Nominal F	low Rates	
Audit	Audit Flow		Flow Rate	Diff.	Lower Limit	Upper Limit	
Point	delta P	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)	
Total Fow Rate	16 59		3.00/13.6		15.0	18.4	
Aux. Flow Rate	13:41	1	13.66	14.02		19.7	
Main Flow Rate	299		3-65		2.7	3.3	
Total Flow Rate	1.54				15.0	18.4	
	16.54		16.68		13.0	10.4	
			Stan	dord			
	Sampler		True				
Amb Temp	23./		riue	Raw			
Amb Press	877		cace	19.7			
Auto Fiess	101/		588.40	672.2			
							-10
Comments:							
					i-		

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE:

October 14, 2011

TO:

Chris Lanane, Scott Weaver

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Lone Pine, January 14, 2011," for your review. Please refer any comments you may have on the document to me by March 14, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

SITE: LONE PINE

Report Date: January 14, 2011 Prepared by: Mike S. Horn

1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Lone Pine was audited on January 12, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

2.0 Parameters Audited:

T.E.O.M. PM-10 FDMS

3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) FDMS ${\bf AUD} \Gamma$

Date of report:	1/14/11						
Date:	1/12/11			Site name:	Lone Pine - FDMS	3	
Start:	14:00hrs. PS	Т		Operator:	Scott Weaver		
Finish:	14:20hrs. PS	Т		Project:	SB 270		
Audited By:	Mike Horn			Site Elevation:	3703	ft.	
Witness:	Scott Weaver			Amb. Pres.:	897.80	hPa	
				Amb. Temp.:	12.1	deg. C	
Prop. or Serial No.:	24928			Make:	R & P		
Type:	PM-10 FD	MS		Model:	1400ab		
				Last cal. date:	12/7/10		
	AUDI	T DEVICE(S)					
Make: BGI Incorporated				Make: BGI Incorporated			
Model:	DELTA CAL			Model:	DELTA CAL		
S/N:	525			S/N:	123		
Range:	2 - 20 lpr	n		Range:	2 - 20	lpm	
	Calibration Factors				Calibration Factor	'S	
Slope:	1.00			Slope:	1.00		
Intercept:	0.00			Intercept:	0.00		
Cal Date:	12/22/10 Da	te of first use 1	/12/11	Cal Date:	12/22/10		
	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.	
Leak check:	0.050	0.320	12.1	0.0	894.48		
Pump off leak check:	N/A	N/A					
	$Qa=[dPxTa/Pa]^{1/2}+b$		Site		Nominal	nal Flow Rates	
Audit	Audit Flow Rate,		Flow Rate	Diff.	Lower Limit	Upper Limit	
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	* *	
Total Flow Rate	16.36	16.36	16.66	1.8	15.0	18.4	
Bypass/Aux Flow Rate	13.39	13.39	13.66	2.0			
Main Flow Rate	2.96	2.96	3.00	1.4	2.7	3.3	
Total Flow Rate	16.31	16.31	16.66	2.1	15.0	18.4	

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

|--|

Wind Speed At ws ≤ 5 m/s, input ± 0.25 m/s;

At ws > 5 m/s, input \pm 5% Starting threshold: 0.5 m/s;

R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H

Wind Direction input $\pm 5^{\circ}$

Starting threshold: 0.5 m/s;

R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young

05103 Wind Monitor

Temperature input $\pm 0.5^{\circ}$ C

input ± 2.0° C for PM-10, PM-2.5 samplers

Relative Humidity Ambient: input $\pm 5\%$ RH, ± 1.5 °C as dew point

Gravimetry Lab: input $\pm 5\%$

Precipitation input $\pm 10\%$

Barometric Pressure Ambient: input \pm 10 hPa

TEOM: ± 10 mm mercury

PM-10: Hi-Vol SSI, Partisol, BGI, input \pm 10%; Design Flow \pm 10%

PM-2.5 input $\pm 4\%$; Design Flow $\pm 5\%$

TEOM: Total Flow input $\pm 10\%$; Design Flow $\pm 10\%$

Main Flow input \pm 10%; Design Flow \pm 10% Bypass Flow input \pm 10%; Design Flow \pm 10%

TEOM: Leak Check Main Flow: < 0.15 LPM

Bypass Flow: < 0.60 LPM

Appendix B

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE

		Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL: D	ate of first use 1/12/11	123	12/22/09	1.0	0.0
BGI Delta CAL:		525	1/4/11	1.0	0.0
Testo 735-1		01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:		Р9	12/17/10	1.0	0.0
RM Young wind speed motor:		CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:		RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-52	25 Precipitation:	52202	N/A		

Date:	Tapered Element Oscillating Microbalance (TEOM)	
Start	FLOW AUDIT F DMS	- 0
Start		T
Start		_
Site Elevation: Amb. Press. \$7	Site Name: June Come	
Site Elevation: Amb. Press. 37 Sin. Hg	Operator: Level Weaver	
Amb. Press. \$97	17.20 Froject: SB270	
Prop. Or Ser. No.: 2 4 9 7 8	Site Elevation: ft	
Prop. Or Ser. No.: 2 1 978	Amb. Press.: 897.8 in. Hg	52
Audit Device(s)	Amb. Temp.: 1, deg. C	-
Audit Device(s)	11/91V	
Last Cal. Date:		
Audit Device(s) Make: RGI INCORPORATED Model: DELTA CAL S/N: 0123	110001 11000 1	
Make: BGI INCORPORATED Make: BGI INCORPORATED	Last Cai. Date.	
Make: BGI INCORPORATED Make: BGI INCORPORATED	Audit Device(s)	-
Model: DFLTA CAL Model: SIN: GAL		-
S/N: 6123 S/N: 0123 Range: 2 - 20 lpm Range: 2 - 20 lp		-
Range: 2 - 20 lpm Range: 2 - 20 lpm		-
Calibration factors: Slope: 1 0 Slope: 1 0 Int.: 0 0 Int.: 0 0 O O O O O O O O	A SUCCESSION OF THE SUCCESSION	-
Slope: 1 . 0	Calibration factors:	-
Int. 0 0		-
Cal Date: Q₂=m[dPxT₂/P₂]¹/²+b Altitude Correction Factor: → 1013 Leak Check-Initial Main: , 05 Aux: 3.2 Leak Check-Final Main: Aux: 3.2 Audit Audit Flow Rate Flow Rate Diff. Lower Limit Upper Limit Point delta P (VLPM) (VLPM) (%) (LPM) (LPM) Total Fow Rate 13.26 3.26/3.6 15.0 18.4 Aux. Flow Rate 13.26 2.7 3.3 Total Flow Rate 16.3 16.6 15.0 18.4 Amb Temp 10.3 16.6 15.0 18.4 Amb Press .8 4 2 894.48 87.7 894.48 87.7		-
Ca		
Leak Check-Initial Main: Aux: 3.2 Leak Check-Final Main: Aux: Nominal Flow Rates Audit Audit Flow Rate Diff. Lower Limit Upper Limit Point delta P (VLPM) (VLPM) (Va) (LPM) (LPM) Total Fow Rate 13.66 15.0 18.4 Aux. Flow Rate 13.66 2.7 3.3 Total Flow Rate 16.3 16.66 15.0 18.4 Sampler True Raw 15.0 18.4 Amb Temp 12 894.48 897.8 894.48		-
Leak Check-Initial Main: Aux: 3.2 Leak Check-Final Main: Aux: Nominal Flow Rates Audit Audit Flow Rate Diff. Lower Limit Upper Limit Point delta P (VLPM) (VLPM) (Va) (LPM) (LPM) Total Fow Rate 13.66 15.0 18.4 Aux. Flow Rate 13.66 2.7 3.3 Total Flow Rate 16.3 16.66 15.0 18.4 Sampler True Raw 15.0 18.4 Amb Temp 12 894.48 897.8 894.48	T _a /P _a] ^{1/2} +b Altitude Correction Factor: - 1013	+
Leak Check-Final Main: Aux:		
Site	Main: , 65 Aux: , 3 7	
Audit Audit Flow Rate Flow Rate Diff. Lower Limit Upper Limit Point delta P (VLPM) (VLPM) (%) (LPM) (LPM) Total Fow Rate 10.36 3.06/3.66 15.0 18.4 Aux. Flow Rate 1.76 3.06 2.7 3.3 Total Flow Rate 16.5 16.6 15.0 18.4 Standard Sampler True Raw Amb Temp 1) 3.86 3.7 3.3 Amb Press 3.84.2 8.94.48 3.7 3.3	Harris Maria Cara Cara Cara Cara Cara Cara Cara	
Audit Audit Flow Rate Flow Rate Diff. Lower Limit Upper Limit Point delta P (VLPM) (VLPM) (%) (LPM) (LPM) Total Fow Rate 10.36 3.06/3.66 15.0 18.4 Aux. Flow Rate 1.76 3.06 2.7 3.3 Total Flow Rate 16.5 16.6 15.0 18.4 Standard Sampler True Raw Amb Temp 1) 3.86 3.7 3.3 Amb Press 3.84.2 8.94.48 3.7 3.3		+-
Audit Flow Rate Flow Rate Diff. Lower Limit Upper Limit Point delta P (VLPM) (VLPM) (%) (LPM) (LPM) Total Fow Rate 4		\vdash
Total Fow Rate	Audit Flow Rate Flow Rate Diff. Lower Limit Upper Limit	1
Aux. Flow Rate		1-
Main Flow Rate 7. 77 3.00 2.7 3.3 Total Flow Rate 7. 77 3.00 15.0 18.4 Standard True Raw Amb Temp 12		T
Main Flow Rate 2.74 3.60 2.7 3.3 Total Flow Rate 763 16.6 15.0 18.4 Standard Sampler True Raw Amb Temp 17	3.39 13.66	-
Sampler True Raw Amb Temp 1) . Amb Press ,8%2, 894,48 897,8	3.00 2.7 3.3	†
Sampler True Raw Amb Temp 12	6.3 16.6 15.0 18.4	1
Sampler True Raw Amb Temp 12		-
Amb Press . 883 894.48 897.8		1
Amb Press . 8 8 2 8 9 4 4 8 8 9 7 8		
Comments:	894.48 87 1.8	
Comments:		
	4 4 4	
Calibrated By: Muli 1860		